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of the scattered sources and gathered here an extremely interesting collection of maps, pictures and observations on glaciers and snow fields of all kinds. Surely all students of earth science will thank him for this work and the ample references.

He divides his subject into Mountain Glaciers, Arctic Glaciers and Antarctic Glaciers. In the first he proposes a much-increased attention to cirque formation as the dominant process at high levels. He objects to the name Valley Glaciers because they rarely get far into their valley, lying mostly within the "mother cirque" (p. 52). He would call them rather Radial (Alpine), the second of which names is not new. His classification of Mountain Glaciers under fifteen heads seems to hang together badly. Decreasing snow alimentation is the criterion and it governs 2, 3, 5, 6, 14 and 15 very well if the other nine are omitted.

The large collection of data concerning polar glaciers is of very great value. It is good reading, though so hastily written in places as to be puzzling. Through it runs the thread of a discovery that Professor Hobbs has made about the winds and pressures near the poles. "Unfortunately the theory of polar eddies promulgated by Ferrel and adopted by Davis in his, in many respects, excellent treatise is responsible for a general prevalence of incorrect views concerning the winds of both the earth's polar regions" (p. 265). The 'discovery' is that a local "fixed anticyclone" exists on Greenland and Antarctic, causing outward winds in every direction. So far the discovery is reconcilable with Davis's treatise on meteorology (see p. 231). But Prof. Hobbs holds that the snowfall nourishes the ice sheets by the descent of cirrus ice grains from heights of 14,000 to 25,000 feet down upon the surface, as the cold, heavy, lower air slips off down the slopes of the ice dome. These grains "are melted and vaporized by adiabatic warming and on reaching the cold surface layer of air next the ice are quickly congealed to form flakes of snow" (p. 287). The process is finally checked by too much adiabatic heating, which softens the snow and makes it sticky. Then a long calm allows the heat to radiate away again.

A somewhat headlong seeking for evidence of this process and an ignoring of obvious difficulties mar a very interesting volume, but it remains still a volume of value and interest. MARK JEFFERSON.

Handbuch der Klimatologie. Von Dr. Julius Hann, Professor an der Universität Wien. Band III. Klimatographie. II. Teil. Klima der Gemässigten Zonen und der Polarzonen. Dritte, wesentlich umgearbeitete und vermehrte Auflage. ix and 713 pp. J. Engelhorn's Nachf. Stuttgart, 1911. 23 marks unbound. 9 x 6½.

No discerning person can look through the final volume of the third edition of Hann's magnificent work without being impressed by the author's absolute mastery of his subject. In these days of the rapid growth of scientific literature, whoever, as a recognized authority, critically summarizes this literature, and thereby makes it accessible to his colleagues, is doing an important work. Hann has, for these many years, been rendering just this kind of invaluable service to all who have been trying to keep up with the rapidly-increasing flood of meteorological and climatological literature. We say "trying to keep up," for it is safe to assert that there is but one man in the world who really succeeds in keeping up. And that one man is Hann. No one who has not made a serious effort to keep abreast of this literature can appreciate what it means to be the master of it. Yet Hann is much more than a compiler for others, important as that function is acknowledged to be. He does not merely give us a well-digested and readable summary. He is not content with presenting the work of others just as they left it. When published climatological data need revision, correction, reduction, in order to make them scientifically valuable. He carries out that revision. He gives us better, and more, than do many of the original authorities from whom he has collected his data. In addition, his own original researches, covering a very wide range of subjects in meteorology and climatology, carried on for years with marvelous patience and skill, make every page of his published works a store-house of exact and authoritative information.

All who are in any way concerned with the science of the earth's atmosphere will unite in extending their hearty congratulations to the veteran author upon the completion of this work. The volume deals with the climatology of the temperate and polar zones, the second having taken up the tropics. It is absolutely "up to date." Following an excellent custom, the author has noted, at the end of the Appendix, "geschlossen Mai 1911." Thus anyone who wishes to look up any subject on which he needs the latest data, knows exactly where Hann left off, and where he must begin. The final proof was read in May, and the printed volume was in the present reviewer's hands by the middle of July. There are references in the Appendix to articles which appeared in April, 1911. The one great fact which impresses itself upon the reader of this volume is the tremendously wide range of the author's reading, and his remarkable power of assimilation. Nothing seems to have escaped his watchful eyes, or to have been an excessive burden upon his unfailing memory.

It may seem to many that "dry climatological data" cannot possibly be made interesting. Yet our author, by his vivid descriptions of weather types; by his frequent reference to the effects of climate upon vegetation, upon crop distribution and upon human activities; and by his well-chosen quotations (*e. g.*, Middendorff's remarkably vivid description of the Siberian winter cold), has succeeded admirably in giving us a book which is far from being "hard reading." Many general readers will find much to interest them as, for example, the discussion of the winter climates of the Mediterranean health resorts; of possible climatic changes in Palestine; the description of the weather conditions experienced; and the excellent account of the general characteristics of polar climate, in which are embodied the Nansen-Mohn isothermal and isobaric charts of the north polar area. Our increasing interest in South America gives special interest to the admirable account of the extra-tropical climates of that continent, in which are included such recent publications as those of W. G. Davis on the climate of Argentina (1910), and the several noteworthy papers, of anthropogeographic interest, recently published by Prof. Isaiah Bowman, of Yale.

The section on the United States, of nearly 100 pages, is especially worthy of attention. Without detracting in any way from the importance of Prof. A. J. Henry's "Climatology of the United States" (*Bulletin Q*, Weather Bureau), to which Hann acknowledges that he is indebted for much of his information, it may be said that there has been no general recent account of the climates of the United States as good as that contained in this volume. *Bulletin Q* was, of course, intended as a climatological dictionary, rather than as a connected and concise description and analysis of climate. The criticisms which our author makes of the published temperature data for the United States and of the lack of strictly comparable mean temperatures are justified (Hann has himself reduced some of the temperatures to the 33-year mean), and we are glad to note his appreciation and commendation of the new climatological summaries, by sections. We are especially glad to note the retention, from earlier editions, of Lorin Blodget's description of the general characteristics of the United States climates east of the 100th meridian. Blodget's "Climatology of the United States" is a classic, although almost unknown to the younger generation of meteorologists. Indeed there is much of real climatological interest and value in many of the older accounts of North American travel and exploration, as *e. g.*, in the *Journals* of the Lewis and Clark Expedition. Dr. Fassig's excellent report on the climate and weather of Baltimore receives well-deserved commendation. R. DeC. Ward.

ECONOMIC GEOGRAPHY

Der Pflanzenbau in den Tropen und Subtropen. Von Professor Dr. Max Fesca. Dritter Band. xiv and 361 pp. Verlag von Wilhelm Süsserott, Berlin. 1911. 8½ x 5½.

The concluding volume of Prof. Dr. Fesca's valuable work on economic plants in tropical and sub-tropical regions. The present volume includes citrus and other fruits, oil yielding plants, gums, spices and aromatics, drugs, rubber, gutta-percha, dye stuffs, tanning stuffs, and barks (varieties of cork). The varieties of each species, the climate and soil suitable to them, their cultivation, uses, diseases, product, etc., are treated concisely without sacrifice of essentials. One hundred and three pages are given to rubber and gutta-percha. The three volumes form an authoritative and comprehensive work on this subject.

The Natural History of Coal. By E. A. Newell Arber. x and 163 pp., illustrations and index. Cambridge University Press, 1911. 1s. 6½ x 5.

This is one of the little "Cambridge Manuals of Science and Literature." The author attempts, with good success, to answer simply such questions as the origin of coal, how it was formed. He also discusses problems relating to the geology or the paleobotany of coal, some of which are not yet solved or at least not satisfactorily elucidated. The book ends with a good bibliography and an index.

ANTHROPOGEOGRAPHY

Influences of Geographic Environment, on the Basis of Ratzel's System of Anthropo-geography. By Ellen Churchill Semple. xvi and 683 pp.; 21 maps. Henry Holt & Co., New York, 1911. $4.

Ratzel carried the investigation of geographic influences upon man and history a long step forward and embodied much of the fruit of his research in a book; his *Anthropo-Geography.* Moreover, he inspired a pupil to take up the investigation and carry it forward. This was a greater service. That pupil was Miss Ellen C. Semple, an American. To produce a book like this requires a combination of four factors not often within the reach of one person,—deep interest in a great subject, ability to handle it, training, and leisure. Nor does this imply that Miss Semple's book is simply the product of leisure hours. On the contrary, it bears every evidence of having cost a prodigious amount of labor.